PATENT 3919A (CON)

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICANT: Dettling, et al.
PRIOR
APPLICATION: 09/067,820 filed April 28, 1998
TITLE: MONOLITHIC CATALYSTS AND RELATED PROCESS FOR MANUFACTURE
ART UNIT: 1772
EXAMINER: L. Lee

June 1, 2001

Commissioner for Patents
United States Patent and Trademark Office
Washington, DC 20231

PRELIMINARY AMENDMENT

Sir:

Preliminary to examination of the above-referenced application, please amend the above referenced application as follows:

In the Specification:

A clean text of amended specification paragraphs follows and the "clean paragraphs" claims are to be substituted for the corresponding paragraphs filed in the subject application. Attached separately as "Exhibit B" is a recitation of the specific amendments.

CERTIFICATE OF MAILING UNDER 37 C.F.R. 1.10

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Date: June 1, 2001

Phyllis Nova

Amend Paragraph at page 1, lines 3-9:

The present application is a continuation-in-part of concurrently filed U.S. Serial No. 09/067,831 file April 28, 1998, now U.S. Patent No. 5,953,832, entitled, "METHOD FOR DRYING A COATED SUBSTRATE", attorney docket number 3924, and U.S. Patent Application, Serial No. 08/962,363 filed October 31, 1997, now U.S. Patent No. 5,866,210 which is a continuation of U.S. Serial No. 08/668,385 filed June 21, 1996, now abandoned, attorney docket number 3983, both herein incorporated by reference.

Amend Paragraph at page 2, line 31 to page 3, line 13:

A further improved method is disclosed in U.S. Serial No. 08/962,363, filed October 31, 1997, now U.S. Patent No. 5,866,210, which is a continuation of 08/668,385 filed June 21, 1996 and entitled, "METHOD FOR COATING A SUBSTRATE". There is disclosed a vacuum infusion method for coating monolithic substrates in which each of the channels comprising the substrate is coated with the same thickness of the coating and is characterized by a uniform coating profile. The term "uniform coating profile" as used herein means that each channel of the substrate will be coated over the same length. In particular, the method is directed to a vacuum infusion method for coating a substrate having a plurality of channels with a coating media comprising:

a) partially immersing the substrate into a vessel containing a bath of the coating media, said vessel containing an amount of coating media sufficient to coat the substrate to a desired level without reducing the level of the coating media within the vessel to below the level of the immersed substrate;

b) applying a vacuum to the partially immersed substrate at an intensity and a time sufficient to draw the coating media

upwardly from the bath into each of the channels to form a uniform coating profile therein; and

c) removing the substrate from the bath.--

Amend Paragraph at page 3, lines 19-23:

The above referenced parent U.S. Patent No. 5,866,210 which is a Continuation of U.S. Serial No. 08/668,385 now abandoned, discloses that a substrate may be inverted and coated from an opposite end producing two coatings having uniform coating profile. There is disclosed that if there is any overlap, it is much smaller than with prior art methods.

Amend Paragraph at page 3, lines 24-37:

U.S. Patent No. 5,953,832 discloses that after coating, the substrate or monolithic honeycomb can be rapidly and thoroughly dried without adversely affecting the coating profile. In particular, the disclosed method dries a monolithic substrate having a plurality of channels and a coating media thereon by removing the coated monolithic substrate from a bath containing the coating media while the coating media is in a wet condition. A vacuum is applied to the coated monolith substrate at an intensity in time sufficient to draw vapor out of the channels without substantially changing the coating profile within the channels. In a specific and preferred embodiment, the vacuum is imposed at one end of the substrate while gas at an elevated temperature is introduced into the opposite end of the substrate to facilitate drying.

Amend Paragraph at page 6, lines 10-30:

The present invention is directed to a substrate, preferably a honeycomb comprising a plurality of channels defined by the honeycomb walls. The channels, and wall elements are parallel and typically axial to the axis of the substrate. The honeycomb has an inlet end and an

outlet end, with at least some of the channels having a corresponding inlet and outlet. There is a first inlet layer located on the walls and extending for at least part of the length from the inlet end toward the outlet end to an inlet layer axial end. The first inlet layer extends for only part of the length from the inlet end toward the outlet end. The first inlet layer comprises a first inlet composition comprising at least one first inlet component selected from first inlet base metal oxides. The first inlet layer is coated by a method comprising the steps of passing a fluid containing the first inlet composition into the inlet end of the substrate to form the first inlet layer, and then applying a vacuum to the outlet end while forcing a heated gas stream through the channels from the inlet end without significantly changing the length of the first inlet layer. In certain embodiments a one or more layer can be applied over the entire channel length by conventional methods and used in combination with the method of the present invention.

Amend Paragraph at page 6, line 36 to page 7 line 13:

In a specific and preferred embodiment there can be a second inlet layer located on the walls and extending for at least part of the length from the inlet end toward the outlet end to a second layer axial end. The second layer can be supported directly or indirectly on the first inlet layer for at least part of the length of the first inlet layer, the second layer comprising a second inlet composition comprising at least one second inlet component selected from second inlet base metal oxides. The second inlet layer coated by a method comprising the steps of passing a fluid containing the at least one second inlet composition into the inlet end of the substrate to form the at least one inlet layer and applying a vacuum to the outlet end while forcing a heated gas stream through the channels from the inlet end without significantly changing the length of the second inlet layer.

Amend Paragraph at page 7, lines 27-40:

In another specific embodiment there can be a first outlet layer located on the walls and extending for at least part of the length from the outlet end toward the inlet end to an outlet layer axial end. The first outlet layer extends for only part of the length from the outlet end toward the inlet end. The first outlet layer comprises a first outlet composition comprising at least one first outlet component selected from first outlet base metal oxides. The first outlet layer is coated by a method comprises the steps of passing a fluid containing the first outlet composition into the outlet end of the substrate to form the first outlet layer and applying a vacuum to the outlet end while forcing a heated gas stream through the channels from the outlet end without significantly changing the length of the first outlet layer.

Amend Paragraph at page 8, line 6 to page 9, line 4:

Another embodiment comprises the second outlet layer located on the walls and extending for at least part of the length from the outlet end toward the inlet end to a second layer axial end. The second layer can be supported directly or indirectly on the first outlet layer for at least part of the length of the first outlet layer. The second layer comprising a second outlet composition comprising at least one second outlet component selected from second outlet base metal oxides. The second outlet layer coated by a method comprising the steps of passing a fluid containing the at least one second outlet composition into the outlet end of the substrate to form the second outlet layer, and then applying a vacuum to the outlet end while forcing a heated gas stream through the channels from the outlet end without significantly changing the length of the second outlet layer. The at least one second outlet base metal oxides are selected from a second outlet refractory oxide, a second outlet rare earth metal oxide, a second outlet transition metal oxide, a second outlet alkaline earth metal oxide, and a molecular sieve.

Preferably the second outlet composition comprises at least one second outlet precious metal component. Preferably there is at least one precious metal component selected from the first outlet precious metal component and the second outlet precious metal component and said precious metal components are selected from at least one of platinum, palladium, rhodium, ruthenium and iridium components. In each of the embodiments, for the various layers including the first layer and the second inlet layer, and the first layer and the second outlet layer the heated gas is preferably air but can be any suitable gas such as nitrogen. The temperature of the heated gas is preferably from about 75°C to about 400°C. The temperature of the heated gas is preferably from 75°C to 200°C to dry the various layers. The temperature of the heated gas is preferably from 200°C to 400°C to fix the precious metal component of the various layers. The heated gas is passed over the layers for a sufficient time to dry as to fix the precious metal of compositions of the various layers. The at least one precious metal component selected from the first outlet precious metal component and the second outlet precious metal component.

In the Claims:

A clean text of amended claims 1, 9, 14, 10, 17, 18, 19, 27, 28, 37-42, 45, 46 and 51 follows and the "clean text" claims are to be substituted for the corresponding claims filed in the subject application. Attached separately as "Exhibit A" is a marked up version of the amended claims showing the changes made to the claims from their form existing prior to this Amendment.

1. (Amended) An article comprising:

a wall flow honeycomb substrate comprising an inlet end, an outlet end, axial wall elements extending from the inlet end to the outlet end, and a plurality of axially enclosed channels defined by

the wall elements,; and

a first inlet layer located on the walls and extending for at least part of the length from the inlet end toward the outlet end to an inlet layer axial end, with the first inlet layer extending for only part of the length from the inlet end toward the outlet end, the first inlet layer comprising a first inlet composition comprising at least one first inlet component selected from first inlet base metal oxides.

9. (Amended) The article as recited in claim 1 further comprising

a second inlet layer located on the walls and extending for at least part of the length from the inlet end toward the outlet end to a second layer axial end, the second layer supported directly or indirectly on the first inlet layer for at least part of the length of the first inlet layer, the second layer comprising a second inlet composition comprising at least one second inlet component selected from second inlet base metal oxides.

10. (Amended) An article comprising:

a wall flow honeycomb substrate comprising an inlet end, an outlet end, axial wall elements extending from the inlet end to the outlet end, and a plurality of axially enclosed channels defined by the wall elements, with at least some of the channels having a channel inlet at the inlet end and a channel outlet at the outlet end;

a first inlet layer located on the walls and extending for at least part of the length from the inlet end toward the outlet end to an inlet layer axial end, with the first inlet layer extending for only part of the length from the inlet end toward the outlet end, the first inlet layer comprising a first inlet composition comprising at least one first inlet component selected from first inlet base metal oxides; and

a second inlet layer located on the walls and extending for at least part of the length from the inlet end toward the outlet end to a second layer axial end, the second layer supported directly or indirectly on the

first inlet layer for at least part of the length of the first inlet layer, the second layer comprising a second inlet composition comprising at least one second inlet component selected from second inlet base metal oxides,

wherein the at least one second inlet base metal oxides are selected from a second inlet refractory oxide, a second inlet rare earth metal oxide, a second inlet transition metal oxide, and a second inlet alkaline earth metal oxide, and a second inlet molecular sieve.

14. (Amended) The article as recited in claims 9 or 10 further comprising at least one second inlet precious metal component.

17. (Amended) The article as recited in claim 14 wherein there is at least one precious metal component selected from the first inlet precious metal component and the second inlet precious metal component.

18. (Amended) The article as recited in claim 17 wherein at least one precious metal component selected from the first inlet precious metal component and the second inlet precious metal component and said precious metal components is selected from at least one of platinum, palladium, rhodium, ruthenium and iridium components.

19. (Amended) The article as recited in claims 1 or 10 further comprising:

a first outlet layer located on the walls and extending for at least part of the length from the outlet end toward the inlet end to an outlet layer axial end, with the first outlet layer extending for only part of the length from the outlet end toward the inlet end, the first outlet layer comprising a first outlet composition comprising at least one first outlet component selected from first outlet base metal oxides.

27. (Amended) The article as recited in claim 19 further comprising:

a second outlet layer located on the walls and extending for at

least part of the length from the outlet end toward the inlet end to a second layer axial end, the second layer supported directly or indirectly on the first outlet layer for at least part of the length of the first outlet layer, the second layer comprising a second outlet composition comprising at least one second outlet component selected from second outlet base metal oxides.

28. (Amended) The article as recited in claim 27 wherein the at least one second outlet base metal oxides are selected from a second outlet refractory oxide, a second outlet rare earth metal oxide, a second outlet transition metal oxide, and a second outlet alkaline earth metal oxide, and a second outlet molecular sieve.

37. (Amended) The article as recited in claim 27 wherein at least a portion of at least one of the first or second inlet layers overlaps with at least one of the first or second outlet layers.

38. (Amended) The article as recited in claims 1 or 9 wherein the substrate has at least two adjacent zones, a first zone and a second zone, each extending axially along the length of conduit wherein the first zone extends from the inlet end and the second zone extends from the outlet end along a separate length of the conduit than the first zone with each zone comprising the same catalyst architecture with said zone.

39. (Amended) The article as recited in claim 38 wherein at least one layer of said first zone, and at least one layer of said second zone overlap to form at least one intermediate zone between the first zone and the second zone.

40. (Amended) The article as recited in claim 38 wherein there is an uncoated zone between the first zone and the second zone.

41. (Amended) The article as recited in claim 38 wherein there are at least three zones.

42. (Amended) The article as recited in claims 1 or 9 wherein the substrate comprises a monolithic honeycomb comprising a plurality of parallel channels extending from the inlet to the outlet.

45. (Amended) The article as recited in claims 1 or 9 wherein at least one layer contains no precious metal component.

46. (Amended) The article as recited in claims 1 or 9 wherein the comprising at least one inlet layer and at least one outlet layer, at least inlet composition comprising at least one first inlet refractory oxide composition or composite comprising a first inlet refractory oxide selected from the group consisting of alumina, titania, zirconia and silica, an inlet and optionally a zeolite, and at least one inlet precious metal component, and the at least one outlet layer comprising an outlet composition comprising at least one outlet refractory oxide composition or selected from the group consisting of alumina, titania, zirconia and silica, and at least one second outlet precious metal component, and optionally an outlet zeolite.

51. (Amended) The article as recited in claim 46 wherein the at least one inlet precious metal component is fixed to at least one of the inlet refractory oxide composition or composite and the first rare earth metal oxide, and at least one of the outlet precious metal component is fixed to the at least one of the outlet refractory oxide composition or composite and the rare earth metal oxide.

Cancel claims 3-5, 7, 8, 11-13, 15-17, 21-23, 25, 26, 29-31, 33, 34, and 52-74 without prejudice to filing a divisional application.

REMARKS

Reconsideration of the above referenced application, as amended, is respectfully requested.

Election/Restriction in Parent Application

In the parent application the Examiner had required restriction under 35 USC § 121 between Group I claims 1-51, Group II claims 52-73 and Group III claim 74. Applicants elected of Group I, claims 1-51 with traverse. The Examiner made the restriction requirement final. Accordingly, claims from Groups II and III have been canceled without prejudice to filing a divisional application.

35 USC § 112 in Parent Application

In an Office Action dated September 23, 1999 in the parent application claims 1, 9, 19, 27, 28 and 51 had been rejected under 35 USC § 112, second paragraph as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicants regard as the invention. The claims had been amended and the rejection had been withdrawn in the Office Action June 19, 2000 in the parent application.

Amendments

The original claims 1-51 contained independent claim 1 and claims 2-51 which depended from independent claim 1 which was directed to an article comprising as substrate... . The present claims include independent claims 1 and 10 which have been amended to incorporate the subject matter relating to a wall flow substrate of claim 44. Additionally, the claims have been amended to delete reference to the process steps and be in "article" format and not in "product-by-

process format".

Rejection under 35 USC § 103 in Parent Application

Claims 75-79 in the parent application directed to embodiments comprising a wall flow substrate had been rejected under 35 USC § 103 as being unpatentable over Dalla Betta et al., WO 92/09848 ("Dalla Betta") in view of U. S. Patent No. 5492679 to Ament et al. ("Ament").

Applicants also refer the Examiner the rejection of claims in the parent application under 35 USC § 103 as being unpatentable over Dalla Betta in view of Hindin et al., U.S. Patent No. 3,993,572 ("Hindin").

Dalla Betta does not disclose or suggest a wall flow substrate with the presently claims layered configurations. Furthermore, Dalla Betta is principally directed to substrate designed for use in methods relating to catalytic combustion.

Ament discloses that wall flow substrates are know in the art for use in treatment of exhaust gases. There is no disclosure or suggest in Ament of a wall flow substrate containing the presently claims layered configurations.

It would not be obvious to combine the disclosure of Dalla Betta with Ament since the substrates are different and designed for different uses.

The disclosure of Hindin does no compensate for the inadequacies of the combination of Dalla Betta and Ament.

For the above reasons the presently claimed is not obvious over Dalla Betta in view of Ament and/or Hindin and allowance of the claims, amended is respectfully requested.

If the Examiner disagrees or believes that for any reason direct contact with Applicants' attorney would advance the prosecution of this application to finality, the Examiner is invited to telephone the undersigned attorney at the number given below.

Respectfully submitted,

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EXHIBIT A - Amendments to Specification

In the Specification:

At page 1, line 4 delete "08/ filed ," and insert --09/067,831 file April 28, 1998, now U.S. Patent No. 5,953,832,--.

At page 1, line 6 after "08/" insert --962,363 filed October 31, 1997, now U.S. Patent No. 5,866,210--.

At page 1, line 8 after "21, 1996," insert -now abandoned,--.

At page 2, line 32, after "filed October 31, 1997" insert --, now U.S. Patent No. 5,866,210,--

At page 3, line 19, delete "Parent" and insert --parent U.S. Patent No. 5,866,210 which is a Continuation of--.

At page 3, line, 20, delete "(attorney docket number 3983)" and insert, --now abandoned,--.

At page 3, line 24, delete "Copending U.S. Serial No. 08/_____ (attorney docket number 3924)" and insert --U.S. Patent No. 5,953,832--.

At page 6, line 19 delete "at least one" and insert --first--.

At page 6, lines 37-38 delete "at least one" and insert --a--.

At page 7, line 2 delete "at least one".

At page 7, lines 4-5 delete "at least one".

At page 7, line 7 delete "at least one".

At page 7, line 13 delete "at least one".

At page 7, line 31 delete "at least one and insert --first--.

At page 8, line 7 delete "at least one" and insert --the--.

At page 8, line 10 delete "at least one".

At page 8, line 12 delete "at least one".

At page 8, line 15 delete "at least one".

At page 8, line 18 delete "at least one" and insert --second--.

At page 8, line 21 delete "at least one".

At page 8, line 33 delete "at least one" and insert --the--.

At page 8, line 33-34 delete "at least one" and insert --the--.

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EXHIBIT B -

Claims Presently in Application, Including Amended Claims with Tracked Changes

1.(Amended) An article comprising:

a wall flow honeycomb substrate comprising an inlet end, an outlet end, axial wall elements extending from the inlet end to the outlet end, and a plurality of axially enclosed channels defined by the ~~the~~ wall elements, ~~with at least some of the channels having a channel inlet at the inlet end and a channel outlet at the outlet end~~; and

a first inlet layer located on the walls and extending for at least part of the length from the inlet end toward the outlet end to an inlet layer axial end, with the first inlet layer extending for only part of the length from the inlet end toward the outlet end, the ~~at least one~~ first inlet layer comprising a first inlet composition comprising at least one first inlet component selected from first inlet base metal oxides~~;~~

~~the first inlet layer coated by a method comprising the steps of:~~

~~passing a fluid containing the first inlet composition into the inlet end of the substrate to form the first inlet layer; and~~

~~applying a vacuum to the outlet end while forcing a heated gas stream through the channels from the inlet end without significantly changing the length of the first inlet layer~~.

2. The article as recited in claim 1 wherein the first inlet base metal oxides are selected from a first inlet refractory oxide, a first inlet rare earth metal oxide, a first inlet transition metal oxide, and a first inlet alkaline earth metal oxide, and a first inlet molecular sieve.

6. The article as recited in claim 1 further comprising at least one first inlet precious metal component.

9. (Amended) The article as recited in claim 1 further comprising

~~at least one~~ second inlet layer located on the walls and extending for at least part of the length from the inlet end toward the outlet end to a second layer axial end, the ~~at least one~~ second layer supported directly or indirectly on the first inlet layer for at least part of the length of the first inlet layer, the ~~at least one~~ second layer comprising a second inlet composition comprising at least one second inlet component selected from second inlet base metal oxides~~;~~

~~the at least one second inlet layer coated by a method comprising the steps of:~~

~~passing a fluid containing the at least one second inlet composition into the inlet end of the substrate to form the at least one inlet layer; and~~

~~applying a vacuum to the outlet end while forcing a heated gas stream through the channels from the inlet end without significantly changing the length of the at least one second inlet layer~~.

10. (Amended) An article comprising:

a substrate comprising an inlet end, an outlet end, axial wall elements extending from the inlet end to the outlet end, and a plurality of axially enclosed channels defined by the wall elements, with at least some of the channels having a channel inlet at the inlet end and a channel outlet at the outlet end;

a first inlet layer located on the walls and extending for at least part of the length from the inlet end toward the outlet end to an inlet layer axial end, with the first inlet layer

extending for only part of the length from the inlet end toward the outlet end, the first inlet layer comprising a first inlet composition comprising at least one first inlet component selected from first inlet base metal oxides; and

a second inlet layer located on the walls and extending for at least part of the length from the inlet end toward the outlet end to a second layer axial end, the second layer supported directly or indirectly on the first inlet layer for at least part of the length of the first inlet layer, the second layer comprising a second inlet composition comprising at least one second inlet component selected from second inlet base metal oxides,

~~The article as recited in claim 9~~ wherein the at least one second inlet base metal oxides are selected from a second inlet refractory oxide, a second inlet rare earth metal oxide, a second inlet transition metal oxide, and a second inlet alkaline earth metal oxide, and a second inlet molecular sieve.

14. (Amended) The article as recited in claims 9 or 10 further comprising at least one second inlet precious metal component.

17. (Amended) The article as recited in claim ~~16~~ 14 wherein there is at least one precious metal component selected from the first inlet precious metal component and the second inlet precious metal component.

18. (Amended) The article as recited in claim 17 wherein ~~there is~~ at least one precious metal component selected from the first inlet precious metal component and the second inlet precious metal component and said precious metal components ~~are~~ is selected from at least one of platinum, palladium, rhodium, ruthenium and iridium components.

19. (Amended) The article as recited in claims 1 or 10 further comprising:

a first outlet layer located on the walls and extending for at least part of the length from the outlet end toward the inlet end to an outlet layer axial end, with the first outlet layer extending for only part of the length from the outlet end toward the inlet end, the ~~at least one~~ first outlet layer comprising a first outlet composition comprising at least one first outlet component selected from first outlet base metal oxides~~;~~

~~the first outlet layer coated by a method comprising the steps of:~~

~~passing a fluid containing the first outlet composition into the outlet end of the substrate to form the first outlet layer; and~~

~~applying a vacuum to the outlet end while forcing a heated gas stream through the channels from the outlet end without significantly changing the length of the first outlet layer~~.

20. The article as recited in claim 19 wherein the first outlet base metal oxides are selected from a first outlet refractory oxide, a first outlet rare earth metal oxide, a first outlet transition metal oxide, and a first outlet alkaline earth metal oxide and first outlet molecular sieves.

24. The article as recited in claim 19 further comprising at least one first outlet precious metal component.

27. (Amended) The article as recited in claim 19 further comprising:

~~at least one~~ second outlet layer located on the walls and extending for at least part of the length from the outlet end toward the inlet end to a second layer axial end, the ~~at least~~

~~one~~ second layer supported directly or indirectly on the first outlet layer for at least part of the length of the first outlet layer, the ~~at least one~~ second layer comprising a second outlet composition comprising at least one second outlet component selected from second outlet base metal oxides~~;~~

~~the at least one second outlet layer coated by a method comprising the steps of:~~

~~passing a fluid containing the at least one second outlet composition into the outlet end of the substrate to form the at least one second outlet layer; and~~

~~applying a vacuum to the outlet end while forcing a heated gas stream through the channels from the outlet end without significantly changing the length of the at least one second outlet layer~~.

28. (Amended) The article as recited in claim 27 wherein the at least one second outlet base metal oxides are ~~is~~ selected from a second outlet refractory oxide, a second outlet rare earth metal oxide, a second outlet transition metal oxide, and a second outlet alkaline earth metal oxide, and a second outlet molecular sieve.

32. The article as recited in claim 27 further comprising at least one second outlet precious metal component.

35. The article as recited in claim 32 wherein there is at least one precious metal component selected from the first outlet precious metal component and the second outlet precious metal component.

36. The article as recited in claim 35 wherein there is at least one precious metal component selected from the first outlet

precious metal component and the second outlet precious metal component and said precious metal components are selected from at least one of platinum, palladium, rhodium, ruthenium and iridium components.

37. (Amended) The article as recited in claims ~~19 or~~ 27 wherein at least a portion of at least one of the first or second inlet layers over laps with at least one of the first or second outlet layers.

38. (Amended) The article as recited in claims 1~~,~~ or 9~~, 19 or 27~~ wherein the substrate has at least two adjacent zones, a first zone and a second zone, each extending axially along the length of conduit wherein the first zone extends from the inlet end and the second zone extends from the outlet end along a separate length of the conduit than the first zone with each zone comprising the same catalyst architecture with said zone.

39. (Amended) The article as recited in claim ~~37~~ 38 wherein at least one layer of said first zone, and at least one layer of said second zone overlap to form at least one intermediate zone between the first zone and the second zone.

40. (Amended) The article as recited in claim ~~37~~ 38 wherein there is an uncoated zone between the first zone and the second zone.

41. (Amended) The article as recited in claim ~~37~~ 38 wherein there are at least three zones.

42. (Amended) The article as recited in claims 1~~,~~ or ~~9, 19 or 27~~ wherein the substrate comprises a monolithic honeycomb comprising a plurality of parallel channels extending from the inlet to the outlet.

43. The article as recited in claim 42 wherein the honeycomb is selected from the group comprising ceramic monoliths and metallic monoliths.

44. The article as recited in claim 42 wherein the honeycomb is selected from the group comprising flow through monoliths and wall flow monoliths.

45. (Amended) The article as recited in claims 1~~,~~ or 9~~, 19 or 27~~ wherein at least one layer contains no precious metal component.

46. (Amended) The article as recited in claims 1~~,~~ or 9~~, 19 or 27~~ wherein the comprising at least one inlet layer and at least one outlet layer, at least inlet composition comprising at least one first inlet refractory oxide composition or composite comprising a first inlet refractory oxide selected from the group consisting of alumina, titania, zirconia and silica, an inlet and optionally a zeolite, and at least one inlet precious metal component, and the at least one outlet layer comprising an outlet composition comprising at least one outlet refractory oxide composition or selected from the group consisting of alumina, titania, zirconia and silica, and at least one second outlet precious metal component, and optionally an outlet zeolite.

47. The article as recited in claim 46 wherein the inlet compositions contain substantially no oxygen storage components.

48. The article as recited in claim 47 wherein the inlet compositions contain substantially no oxygen storage components selected from praseodymium and cerium components.

49. The article as recited in claim 46 wherein at least one of the outlet compositions contain an oxygen storage components.

50. The article as recited in claim 49 wherein at least one of the outlet compositions contains an oxygen storage component selected from praseodymium and cerium components.

51. (Amended) The article as recited in claim 46 wherein the at least one inlet precious metal component is fixed to ~~the~~ at least one of the inlet refractory oxide composition or composite and the first rare earth metal oxide, and ~~the~~ at least one of the outlet precious metal component is fixed to the at least one of the outlet refractory oxide composition or composite and the rare earth metal oxide.